

Structuring Scientific Discourse: Using the "Given-New" Perspective

By Kevin Ngozi Nwogu

For a long time the teaching of writing in most ESL classrooms was characterized by an undue emphasis on the acquisition of mechanical skills like grammar, spelling, and punctuation. This practice persisted because teachers believed that ESL learners needed to master the mechanics of language before they could write meaningful prose. Development of writing competence was retarded because little attention was being given to schemata, semantic organization, thematic structure, or cohesion. However, in recent times, innovations from communicative language teaching-especially in ESP contexts-have shifted the focus away from materials that were essentially a vehicle for presenting structure to those which demand use of "real life" language.

Despite these encouraging developments, a lot still needs to be done in equipping ESP practitioners with the skills necessary to function optimally as members of their discourse community. For instance, ESP teachers need competence in the analysis of academic discourse, especially in science and technology. Swales (1986) reminds us that our role as a communication skills/ESP teacher is like that of a coach helping students to become full participating members of the relevant discourse community. One credible way to articulate this role is through an understanding of the forms and function of genres of written academic discourse. In line with Swales, this paper reports on a study of how information is structured in the experimental research report (Nwogu 1989, 1990). It also demonstrates how this analytical procedure can be applied to materials development for academic writing.

The Study

The study is an exercise in genre-analysis. It examines the differences in organization of discourse in three parallel genres of written medical texts-the abstract to a medical research paper, the research article itself, and the journalistic version of the research article appearing in a popular science magazine or newspaper.

The corpus for the study consisted of 45 texts: 15 sets of parallel texts representing each of the three genres on which the study is based. The texts were analysed for differences at three levels of organization-schematic structure, thematic progression, and cohesion. This article treats only the level of thematic organization, or what shall henceforth be referred to as the "Given-New" information structure.

Underlying the study is the concept of genre, defined by Swales (1992) as a class of communicative events that share some sets of communicative purposes recognized by the expert members of the discourse community. Genre-Analysis is of special interest to ESP practitioners and has wider implications for EAP. This particular study sought, to answer the question: "Does the experimental research report have its own set of organizing principles (rhetorical structure)

that distinguishes it from those of abstracts or journalistic reporting?" Certainly, there can be no better way of answering this question than to examine each genre critically for the language forms and functions that characterize it. The more the ESP/EAP practitioner can do this, the better s/he will be at teaching those areas of academic discourse in which his/her students are engaged.

Theoretical Framework

his article is based on the understanding that:

- Distinctive features of organization can be found in written discourse that can be characterized from the sentence level to the whole text (Cooper and Greenbaum 1986), (Blakemore 1988).
- The structure of an utterance is determined by its use and the communicative context in which it occurs (Lyons 1981).

Utterances can be divided into two parts, each having a function in the overall communication of meaning. The first centers on elements that have been mentioned prior to a particular point in the text. They are recoverable from the text itself or from the extra-linguistic situation-GIVEN. The second component contains those elements that have not been mentioned prior to that point in the text and are not recoverable from the extra linguistic context-NEW. See the example below:

Figure 4: Portfolio Management

One of the most difficult aspects of portfolio use is management: keeping track of entries and progress in portfolio completion and encouraging a high level of motivation. Here are some suggestions for managing in the classroom:

1. Require all students to buy a binder with tabs that will become the portfolio. Ask students to write the entry categories on the tabs and affix a "management sheet" with categories and dates due at the front of the portfolio.
2. Discuss the portfolio, its purposes, rules, and procedures at the beginning of the term and on several other occasions. Remind students frequently of their portfolio commitments.
3. Perform "Portfolio Audits" occasionally so that students can assess their progress and reorganize their portfolios.
4. Make very clear to all students what you value in the portfolios and remind them of how the portfolios will be graded.
5. Give students opportunities to show off their portfolios. For example, they can give portfolio presentations to other classes, faculty or administrators; they can have a contest for the most

creative portfolio design; or they can write introductions (or reflections) to readers, who then respond.

The combination of Given and New forms the configuration known as the "Given-New" information structure. This structure is related to other associated notions such as Theme-Rheme, Topic-Comment, Old-New information structures (See Halliday 1967, 1974).

Ordinarily, given information precedes new information in a normal configuration, but this does not necessarily follow in all cases. New information could proceed given information, and sometimes, all information may be "New," as in imperatives. In written academic scientific discourse, it is expected that "Given" information would normally precede "New".

Identifying Given Information in an Utterance

Of the two elements in the "Given-New" perspective, it is more important to identify what is GIVEN, for if that can be successfully done, the identification of NEW would follow logically. My earlier definition of given information does not make the contextual determination of "givenness" an easy task. Therefore, it is necessary to clarify here other objective criteria upon which the determination of given information can be based. As Danes (1974) suggests, given information may be determined by the following principles: identical wording, synonymous expression, paraphrase, and semantic inference.

Identical wording involves the occurrence in an utterance of elements (lexical items, or phrases) from preceding context in exactly identical form(s). *Synonymous expressions* are those elements (lexical and phrases) in an utterance which communicate information which is similar in meaning, but not identical in wording with an expression in preceding context. *Semantic inference* means the relation of information in previous utterances with those that convey given information at a particular point in text by means of direct or indirect association or contrast. *Paraphrase* involves the presentation of all or part of the information contained in previous or preceding context either by the use of a single lexical item or group of items while still retaining the intended meaning content.

In addition to these criteria, the identification of given information may be made more explicit and precise by adopting the following guidelines:

1. Treat as *Given* an initial item in an utterance which corresponds with the grammatical subject plus any other information which can be deemed recoverable from preceding context.
2. Treat as *Given* any item which functions as connector, e.g. *and*, *however*, *so*, which includes a content item or information recoverable from preceding context.
3. Treat as *Given* an opening adverbial word or phrase, an opening participle phrase, the whole of a dependent clause, an existential *there*, a formal *it*, and their accompanying content items.

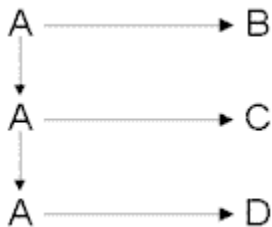
4. Treat as *Given* the *WH* -element in polar questions and *New* the *WH* -element in non-polar question.

Results

The "Given-New" paradigm is an intuitively appealing conceptual framework for describing the structure of information in discourse. However, its appeal does not lie so much in the simple division of an utterance into *Given* and *New* , as in the prospect it offers for extending that process to whole texts and its possibility for revealing the patterns of information structure or progressions of given information in text. Danes (1974) has identified three types of progression that may exist in structures of written discourse. Since these have been reported elsewhere (Nwogu 1989, 1990, 1992) I will only summarize the results obtained in my analysis of the experimental research paper in the field of medicine.

An analysis of texts in the corpus shows that authors of experimental research papers observe the "Given-New" perspective in their organization of information. It also shows that they adopt particular progression patterns of given information in developing information in particular segments of the report.

The most popular type of progression of given information observed in the experimental research papers studied is the one which illustrates a topically linked paragraph or segment of text in the research report. This progression can be represented as:



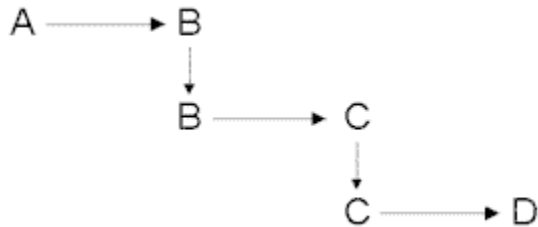
This progression pattern occurred with greater degree of regularity in the methods (85%) and results (70%) sections, especially in paragraphs that involve the description of a state, process, or procedure. The following excerpt from the methods section of one of the texts studied illustrates this progression pattern. The italicized words indicate given information.

1. *Selected characteristics of children, listed according to history of myocardial infarction in their parents* are shown in Table 1. (See journal for table *not shown* .)
2. *Children whose fathers reported a myocardial infarction* were most likely to be white, to smoke cigarettes, to be older, and to be obese, than were children whose fathers did not report a myocardial infarction.
3. *In contrast, although children whose mothers reported a myocardial infarction tended to be older* , no statistically significant differences relating to the disease in the mothers was observed.

[*The New England Journal of Medicine* , Sept. 1986].

In the text above, the elements identified as conveying given information in all three utterances make reference to either children or myocardial infarction in their parents (father or mother). The principle under which given information is determined is that of identical wording.

The next most popular progression type observed in the study is the one of linear chaining of given and new information. This progression pattern can be represented as follows:



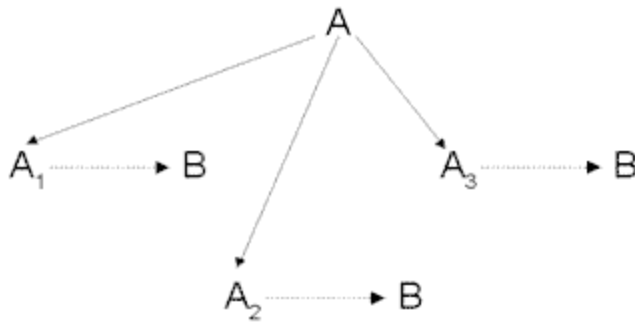
Information expressed towards the end of one utterance is picked up and expressed again, now as given information, in the next utterance. This progression pattern occurred more regularly (80%) in both the introduction and discussion sections. They tended to be associated with paragraphs involving explanations or exposition of ideas or results. Below is an example of a text organized according to this progression pattern.

1. *A growing body of data* shows that blood transfusions have immunological effects on patients and experimental animals beyond those of allo-immunisation to blood cell antigens.
2. *The best characterised clinical consequence* is that of improved renal allograft survival in transfused patients compared with that in those not receiving homologous blood.
3. *These findings* have led to studies on whether transfusion at the time of cancer surgery might be associated with immunological modulation of the patients and infavourable rates of tumor recurrence.

[*British Medical Journal* , 30 August, 1986.]

In the text above, the given information in utterance (1) is recoverable from the extralinguistic context-the writer's reference to previous studies made in research papers. Given information in utterance (2)-"the best characterized clinical consequence"-is picked up from the new information in utterance (1) by semantic inference. And the given information in utterance (3) is picked up from the new information in utterance (2) by paraphrase.

The third progression pattern observed in the study was that which describes what Danes (1974) refers to as a hypertheme or TP with a derived theme. The hypertheme is usually a full utterance. Subsequent utterances express subthemes derived from the hypertheme. This progression pattern can be represented thus:



Examples of this progression pattern were very few. The few instances were found in the discussion section of two of the texts examined. Below is an instance of this pattern identified in the corpus:

Several features of the outbreak are of importance:

First, there is no evidence, after four years, that the outbreak is waning.

Secondly, the age distribution of cases is unusual by comparison with recent national data (See figure in Lancet, not shown.)

Thirdly, throat swabbing revealed a very low carriage rate of B:15 meningococci in symptomless contacts.

[*The Lancet* , 6 September, 1986]

Evidence from texts in this study indicate that the progression of "Given-New" information can account for the structure of information in sections of the experimental research paper. We have seen that the information in paragraphs in particular sections of the research paper can be organized effectively by adopting appropriate progression patterns. This is not to suggest that information in all paragraphs of a given section is organized by means of one progression pattern, but it does suggest is that there is a tendency for information to be organized by means of a particular progression pattern.

Having said this, the following questions need to be asked: Does a linguistic investigation such as the one described for this article have practical applications for the EAP classroom? If it does, In what aspects of language teaching can it be applied?

Certainly, the "Given-New" perspective has a lot to recommend it to teachers of EAP. It has been shown to be useful in the teaching of reading skills (Vande Kopple 1982a, 1982b, 1983; Haviland and Clark 1974; Clark and Haviland 1977); and it has been applied to the teaching of writing (Bock and Irwin 1980). See the appendix for material I wrote which demonstrates how the "Given-New" information structure can form the basis for the development of materials for teaching academic writing.

Conclusion

In this paper, I have tried to show how a "Given-New" perspective of scientific discourse can contribute to the teaching of writing for academic purposes. EAP practitioners need to learn more about written academic discourse to function more effectively in their discourse community. When we teach our students to observe these conventions, we empower them to take on roles in their chosen profession.

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Appendix

Information Structure Analysis

Activity 1: Awareness Raising

- a. Working in pairs, list four mechanical devices you have studied in class.
- b. For each device, identify its various uses.
- c. For each device, identify its constituent components.

Activity 2: Reading

Read the passage below carefully.

The micrometer

A micrometer is an instrument which is used for measuring small distances precisely. It can measure with a precision of 0.01mm. A micrometer consists of a steel frame in the shape of a semi-circle. Attached to one end of this semi-circular frame is a small anvil. The other end of the frame

extends outwards. A piece of metal in the shape of a cylinder fits on this extension. The cylindrical part is called the barrel or sleeve. Inside the barrel is a screw-thread.

Connected to the spindle is another cylindrical piece of metal called the thimble which fits over the barrel. Attached to the end of the thimble is a ratchet, which turns the spindle. Most micrometers have a lock knot, or locking ring, so that the spindle can be locked in any position. Measurements are taken between the anvil and the end of the spindle. They are read off from numbers which are marked on the barrel and on the spindle.

Activity 3: Analyzing Language

When you have finished reading, look at the passage again. We will examine the passage to determine how information is organized from one sentence to the other.

Writers link sentences by combining information that they think their readers already know with new information. Let's call the part of the sentence which carries information that the reader already knows **GIVEN** information, and the part that adds something new as **NEW** information.

Now, let's see what pattern the given and new information show in the passage you have just read.

This information was Given in the title	GIVEN 1. A Micrometer	NEW is an instrument which is used for measuring small distances precisely.
“It can measure” refers to information given in sentence 1.	GIVEN 2. It can measure	NEW with a precision of 0.01mm.
“A micrometer” is information given in sentences 1 and 2	GIVEN 3. A micrometer	NEW consists of a steel frame in the shape of a semi-circle.
The reference to the semi-circular frame is	GIVEN 4. Attached to one end of this semi-	NEW is a small anvil.

given in sentence 3.	circular frame
	GIVEN NEW
The frame refers to the frame mentioned in sentences 3 and 4.	5. The other end of the frame extends outwards.

As we can see from the first four sentences in our passage, given information occurs at the beginning of the sentence while new information occurs towards the end of the sentence.

However, sometimes this movement from given to new information may be disrupted. Look at sentence 6. You will notice that it follows the New-Given pattern as shown below.

NEW	GIVEN	
6. A piece of metal in the shape of cylinder	fits on to this extension.	"This extension" refers to the verb phrase of sentence 5.
	GIVEN NEW	
Reference to the cylindrical part is now GIVEN information	7. The cylindrical part	is called the barrel or sleeve.
	GIVEN NEW	
Reference to the barrel is now GIVEN information	8. Inside the barrel	is a screw thread.

Now look at paragraph 2. Working in pairs, identify Given and New information for each sentence. Explain why you think the information is given or new.

Activity 4: Applying the Pattern

Using one of the mechanical devices you identified in activity 1, describe the device in six sentences. Organize the information in each sentence using the Given-New information pattern.

1. A Micrometer is an instrument which is used for measuring small distances precisely.
2. It can measure with a precision of 0.01mm.
3. A micrometer consists of a steel frame in the shape of a semi-circle.
4. Attached to one end of is a small anvil. this semi-circular frame
5. The other end of the frame extends outwards.
6. Fits on to this extension "This extension" refers to the verb phrase of sentence 5.
7. The cylindrical part is called the barrel or sleeve.
8. Inside the barrel is a screw thread.